



FirstEnergy Nuclear Operating Company

Beaver Valley Power Station
P.O. Box 4
Shippingport, PA 15077

Eric A. Larson
Site Vice President

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December 19, 2014
L-14-357

10 CFR 50.73

ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT:
Beaver Valley Power Station, Unit No. 1
Docket No. 50-334, License No. DPR-66
LER 2014-001-01

Enclosed is Licensee Event Report (LER) 2014-001-01, "Beaver Valley Unit 1 Reactor Trip due to Main Unit Transformer Failure." This event was previously reported in accordance with 10 CFR 50.73(a)(2)(iv)(A) on March 7, 2014. This LER supplement provides additional information gained from further internal inspections of the transformer.

There are no regulatory commitments contained in this submittal. Any actions discussed in this document that represent intended or planned actions are described for the NRC's information, and are not regulatory commitments.

If there are any questions or if additional information is required, please contact Mr. William C. Cothen, Manager, Regulatory Compliance at 724-682-4284.

Sincerely,

Eric A. Larson

Enclosure – LER 2014-001-01

cc: Mr. D. H. Dorman, NRC Region I Administrator
Mr. J. A. Krafty, NRC Resident Inspector
Ms. T. A. Lamb, NRR Project Manager
INPO Records Center (via INPO Consolidated Event System)
Mr. L. E. Ryan (BRP/DEP)

IE22
NRR

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION (01-2014)		APPROVED BY OMB NO. 3150-0104 EXPIRES 01/31/2017 Estimated burden per response to comply with this mandatory information collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov , and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.																																					
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)																																							
1. FACILITY NAME Beaver Valley Power Station Unit Number 1		2. DOCKET NUMBER 05000334	3. PAGE 1 OF 3																																				
4. TITLE Beaver Valley Unit 1 Automatic Reactor Trip due to Main Unit Transformer Failure																																							
5. EVENT DATE <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>MONTH</th> <th>DAY</th> <th>YEAR</th> </tr> <tr> <td style="text-align: center;">01</td> <td style="text-align: center;">06</td> <td style="text-align: center;">2014</td> </tr> </table>		MONTH	DAY	YEAR	01	06	2014	6. LER NUMBER <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>YEAR</th> <th>SEQUENTIAL NUMBER</th> <th>REV NO</th> </tr> <tr> <td style="text-align: center;">2014</td> <td style="text-align: center;">- 001</td> <td style="text-align: center;">- 01</td> </tr> </table>	YEAR	SEQUENTIAL NUMBER	REV NO	2014	- 001	- 01	7. REPORT DATE <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>MONTH</th> <th>DAY</th> <th>YEAR</th> </tr> <tr> <td style="text-align: center;">12</td> <td style="text-align: center;">19</td> <td style="text-align: center;">2014</td> </tr> </table>	MONTH	DAY	YEAR	12	19	2014																		
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10. POWER LEVEL <div style="text-align: center; font-size: 1.2em;">100</div>		<table border="0" style="width:100%;"> <tr> <td><input type="checkbox"/> 20.2201(b)</td> <td><input type="checkbox"/> 20.2203(a)(3)(i)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(C)</td> <td><input type="checkbox"/> 50.73(a)(2)(vii)</td> </tr> <tr> <td><input type="checkbox"/> 20.2201(d)</td> <td><input type="checkbox"/> 20.2203(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(1)</td> <td><input type="checkbox"/> 20.2203(a)(4)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(i)</td> <td><input type="checkbox"/> 50.36(c)(1)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ix)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(ii)</td> <td><input type="checkbox"/> 50.36(c)(1)(ii)(A)</td> <td><input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(x)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iii)</td> <td><input type="checkbox"/> 50.36(c)(2)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(A)</td> <td><input type="checkbox"/> 73.71(a)(4)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iv)</td> <td><input type="checkbox"/> 50.46(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(B)</td> <td><input type="checkbox"/> 73.71(a)(5)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(v)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(C)</td> <td><input type="checkbox"/> OTHER</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(vi)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(D)</td> <td style="font-size: 0.8em;">Specify in Abstract below or in NRC Form 366A</td> </tr> </table>		<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>CAUSE</th> <th>SYSTEM</th> <th>COMPONENT</th> <th>MANU-FACTURER</th> <th>REPORTABLE TO EPIX</th> <th>CAUSE</th> <th>SYSTEM</th> <th>COMPONENT</th> <th>MANU-FACTURER</th> <th>REPORTABLE TO EPIX</th> </tr> <tr> <td style="text-align: center;">E</td> <td style="text-align: center;">EL</td> <td style="text-align: center;">XFMR</td> <td style="text-align: center;">B455</td> <td style="text-align: center;">Y</td> <td style="text-align: center;">D</td> <td style="text-align: center;">BA</td> <td style="text-align: center;">65</td> <td style="text-align: center;">W290</td> <td style="text-align: center;">Y</td> </tr> </table>				CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	E	EL	XFMR	B455	Y	D	BA	65	W290	Y																
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)																																							
<p>On January 6, 2014 at 1659 hours, Beaver Valley Power Station (BVPS) Unit 1 was operating at 100 percent power. An automatic reactor trip occurred due to a main transformer differential protection main unit generator trip. All three Auxiliary Feedwater (AFW) pumps automatically started, as expected, due to lowering steam generator levels. The reactor trip response was as expected with no immediate complications. The main transformer differential protection actuation was determined to be caused by an internal winding fault in the 'B' phase windings due to a dielectric breakdown. The transformer has been replaced.</p> <p>This event is being reported under 10 CFR 50.73(a)(2)(iv)(A) as a condition that resulted in the valid automatic actuation of systems listed in (a)(2)(iv)(B) – (1) automatic Reactor trip, (6) automatic Auxiliary Feedwater pump start. A 10 CFR 50.72 notification was made at 1909 hours on January 6, 2014 to report an automatic reactor trip and a Specified System, Auxiliary Feedwater actuation (EN 49697).</p>																																							

NRC FORM 366A (01-2014)		LICENSEE EVENT REPORT (LER) CONTINUATION SHEET			U.S. NUCLEAR REGULATORY COMMISSION	
1. FACILITY NAME		2. DOCKET	6. LER NUMBER			3. PAGE
Beaver Valley Power Station Unit Number 1		05000334	YEAR	SEQUENTIAL NUMBER	REV NO.	2 of 3
			2014	- 001	- 01	

NARRATIVE

Energy Industry Identification System (EIS) codes are identified in the text as [XX].

CONDITIONS PRIOR TO OCCURRENCE

Unit 1: Mode 1, 100% Power

There were no systems, structures, or components (SSCs) that were inoperable at the start of the event that contributed to the event.

DESCRIPTION OF EVENT

On January 6, 2014 at 1659 hours, Beaver Valley Power Station (BVPS) Unit 1 was operating at 100 percent power. An automatic reactor trip occurred due to a main transformer [XFMR] differential protection [87] main unit generator [GEN] trip. All three Auxiliary Feedwater (AFW) [BA] pumps [P] automatically started as expected due to lowering steam generator [SG] levels. The normal and emergency AC busses [BU] were powered from the offsite supply during this event. Since power to the Emergency Busses was not lost, the Emergency Diesel Generators [DG] were not required to start. The reactor trip response was as expected with no immediate complications. At 1757 hours the plant was stabilized in Mode 3.

At 1848 hours the Control Room received an alarm indicating that the Turbine Driven AFW (TDAFW) pump had stopped. The responding operator reported that the pump had tripped and the two Motor Driven AFW (MDAFW) pumps were operating properly. At 1902 hours the MDAFW pumps were secured. Subsequent investigation revealed that the TDAFW pump had tripped on over-speed due to governor [65] oscillations. (Reference BVPS Unit 1 LER 2014-002-00, Beaver Valley Unit 1 Turbine Driven Auxiliary Feedwater Pump Governor Oscillations Result in Pump Trip, for TDAFW pump details)

CAUSE OF EVENT

The cause of the main transformer differential trip was determined to be an internal winding fault in the 'B' phase windings due to a dielectric breakdown. This is supported by the results of post fault oil analysis, transformer turns ratio testing, fault recorder data, internal inspections and the "B" Phase coil package inspection. A fault was found on one of the High Voltage coils of the transformer. Due to the extent of damage, the exact cause of the dielectric breakdown cannot be identified. The following conditions may have caused the event to occur: migration of contamination due to overheated oil, a latent manufacturing defect, and/or static electrification.

ANALYSIS OF EVENT

On January 6, 2014 at 1659 hours, Beaver Valley Power Station (BVPS) Unit 1 was operating at 100 percent power. An automatic reactor trip occurred due to a main transformer differential protection main unit generator trip. All three Auxiliary Feedwater (AFW) pumps automatically started, as expected, due to lowering steam generator levels. The reactor trip response was as expected with no immediate complications.

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<p>NARRATIVE</p> <p>The plant risk associated with the BVPS Unit 1 automatic reactor trip and an Auxiliary Feedwater actuation, on January 6, 2014, due to a main unit transformer differential trip is considered to be very low. This is based on the conditional core damage probability and conditional large early release probability for the event when considering the actual plant conditions that were present at the time of the event.</p> <p>Based on the above, the safety significance of the automatic reactor trip and Auxiliary Feedwater actuation event on January 6, 2014, was very low.</p> <p>CORRECTIVE ACTIONS</p> <ol style="list-style-type: none"> 1. Replacement of the Main Unit Transformer. (Complete) 2. Establish a sequence of operation, for both Units' transformers, that minimizes the potential for static electrification. 3. Evaluate training for the appropriate departments on lessons learned from this event. <p>Completion of the above and other corrective actions is being tracked through the BVPS Corrective Action Program.</p> <p>PREVIOUS SIMILAR EVENTS</p> <p>A review identified the following historical BVPS Unit 1 events involving a failure of the main unit transformer.</p> <p>BVPS LER 94-005-00 - Main Transformer Bushing Failure Results In Electrical Grid Disturbance and Dual Unit Reactor Trip.</p> <p>BVPS LER 78-043-00 - Main Transformer Failure and Inadvertent SI</p> <div style="text-align: right; margin-top: 20px;"> CR 2014-00175, 12779 </div>						